

NOTE

Larval Development of *Cylindrotoma distinctissima americana* Osten Sacken, 1865 (Tipulidae: Cylindrotominae) on *Maianthemum dilatatum* (Liliaceae) in California

The genus *Cylindrotoma* Macquart is unique among North American crane flies because its members feed on the developing leaves of higher plants. Other members of the nearly worldwide subfamily Cylindrotominae feed on moss as well as higher plants (Alexander and Byers 1981).

One of us (GP) had the opportunity to collect the larvae of *Cylindrotoma distinctissima americana* Osten Sacken on leaves of the false-lily-of-the-valley (or mayberry), *Maianthemum dilatatum* (Wood) Nels. & Macbr. (Liliaceae) in northern California. This report discusses this find and briefly describes the larvae and pupae. This is the first record of this crane fly species, and of the subfamily Cylindrotominae, in California. The previously known distribution of *Cylindrotoma distinctissima americana* was from British Columbia to Oregon (Alexander 1967, Oosterbroek 2002). This is also the first record of this crane fly species feeding on *Maianthemum dilatatum*. Previously recorded host plants in North America are *Allium*, *Anemone*, *Trautvetteria*, *Stellaria*, and *Viola* (Brodo 1967).

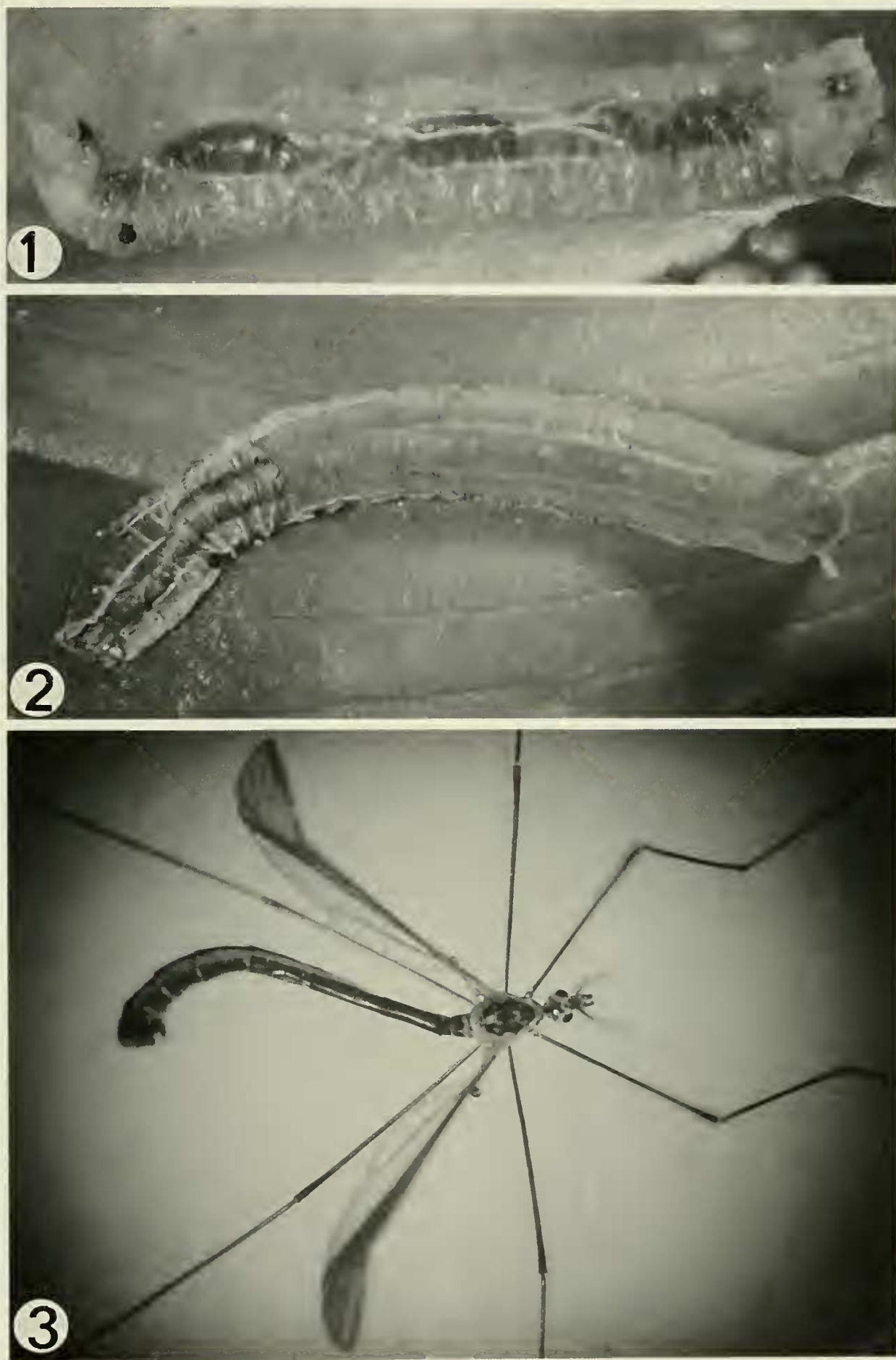
The host plant, *M. dilatatum*, is native to western North America from Alaska to California (Hitchcock and Cronquist 1973). It is especially abundant along the Pacific Northwest coast, where it normally grows in the shade of large trees, but can be found completely exposed, even almost adjacent to the high tide level. It is a perennial normally not reaching over 40 cm tall, that dies back in the fall and grows anew in the spring from slender rhizomes (Hitchcock and Cronquist 1973).

Populations of *M. dilatatum* harboring *Cylindrotoma* larvae were discovered in a moist forest of Sitka spruce (*Picea sitchensis* (Bong.) Carr. (Pinaceae) near Lake

Earl in Humboldt County, northwestern California, on April 13, 2001.

The larval and pupal stages ($n = 8$) were observed and photographed at the site. The mature larvae were unlike any other leaf-feeding insects found on this plant. They were green and relatively smooth except for a pair of small protuberances on the dorsum of each abdominal segment except the last (Fig. 1). The larvae fed on the dorsal and ventral sides of the leaves, leaving large holes very similar to damage caused by sawfly larvae feeding on the same plant species in Oregon. When mature (length = 12 mm), the larvae pupated on the upper surface of the leaves in a very peculiar manner. The last molt was incompletely shed, with the posterior portion of the pupa remaining within the anterior part of the last larval skin (Fig. 2). The skin served as a holdfast to the leaf surface and could not be removed without tearing it apart. This was the only portion of the pupa attached to the leaf surface. The pupae were smooth, green, 13 mm in length, with a pair of thoracic respiratory horns as the only body projections (Fig. 2). Both the larvae and pupae were well camouflaged on the leaves. The adults (length 13 mm) emerged within two weeks after pupation (Fig. 3).

Observations reported here are similar to those reported by Cameron (1918), who studied the same species of Cylindrotominae (under the name of *C. splendens* Doane, 1900) developing on the leaves of *Trautvetteria caroliniensis* (Walt.) Vail (= *T. grandis* Nutt.) (Ranunculaceae) in British Columbia. It is interesting that this species can develop on both monocots and dicots. In both cases (California and British Columbia) the host plants were understory herbs in damp, well shaded, forested areas.



Figs. 1-3. *Cylindrotoma distinctissima americana*. 1, Mature larva (L = 12 mm) feeding on a leaf of *Maianthemum dilatatum*. 2, Pupa (L = 13 mm) attached to a leaf of *Maianthemum dilatatum* by the dried last larval skin. 3, Adult that emerged from the pupa in Fig. 2.

Cameron (1918) reported mature larvae measuring 17 mm, which is larger than the California specimens. However the sizes of the pupae (11.7–13.3 mm) in British Columbia were similar to those in California (13 mm). According to Cameron (1918), the larvae overwinter and resume development the following spring. This could be quite possible with the California populations, although this aspect of the life cycle was not investigated.

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